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AN EVALUATION OF WINDTHROW AT THE CLOVER CREEK DEVELOPMENT SITE, SEQUOIA NATIONAL PARK

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ABSTRACT

Numerous windthrown mature true firs were examined at the Clover Creek development site. The blowdown was adjacent to areas that had been cleared during the construction of roads and parking lots. Strong winds were the primary cause of failure, with shallow soils, rocky subsoils, high water tables and root disease acting as predisposing factors. If future human injury and/or property damage is to be prevented, it is essential to remove additional high risk trees prior to site completion.

INTRODUCTION

On April 7, 1988, John Pronos and Susan Frankel, Forest Pest Management (FPM) plant pathologists, met with Tom Warner and Charlie Castro and visited the Clover Creek Development site.

The site was previously examined by Pest Management personnel on July 12-16, 1982, and their findings were summarized in FPM Report No. 82-33. Several concerns were raised in the report. The stands at Clover Creek are over-mature, decadent, and contain many large defective trees. The impact of annosus root disease is significant, especially on true firs. Portions of the site have shallow soils, with either a rocky subsoil, high water table, or both. The number of down trees indicated that windthrow was a frequent and on-going occurrence. All of these factors point to a site, that if developed, could create very hazardous situations.

The 1982 FPM report recommended taking special considerations to avoid placing buildings and improvements in high risk areas, and to remove defective trees prior to site completion. As a result of these recommendations, Resource

Management personnel identified and marked many defective, high-risk trees. Some of these trees were removed during the last construction phase, but most remain on the site. The complex nature and legal requirements of contracts did not allow for all marked hazardous trees to be removed.

Upon visiting the area this winter, Park personnel noted an unusually high number of recently failed trees and requested assistance from FPM in determining the cause and management implications of the down trees relative to potential future failures.

OBSERVATIONS

More than 50 trees were uprooted during the past winter. A sample of the windthrow showed that 90% of the down trees were white firs, from 16 to 48 inches dbh and 75 to 180 feet tall. These trees were adjacent to openings created by parking lot and road construction. They were concentrated at Loops "C" and "G". Orientation of down trees indicated that all fell at approximately the same time due to strong winds blowing from the east or northeast. This pattern is suggestive of Mono winds (see attached FPM Report 86-6 from the Kings River Ranger District, Sierra National Forest).

Some of these trees were predisposed to windfall by conditions noted in our 1982 report -- annosus root disease, shallow soils, and a high water table. Another root rot fungus, Armillaria sp., was present on many roots but was not judged to be causing significant structural weakness.

Many of the down trees showed no structural weakness due to biological or site factors and appear to have blown down due solely to strong winds. There were a few trees that snapped off above ground and did not have defects at the point of failure. Before clearings were created, these trees were protected from the direct force of winds by neighboring trees.

Several areas not adjacent to openings or clearings were also examined. No recently failed trees were found. Trees on the ground here appeared to have fallen at various times over many decades and did not show any directional pattern of failure.

DISCUSSION AND CONCLUSIONS

The importance of identifying and removing all weak, defective, and potentially hazardous trees prior to developing this site cannot be over emphasized. Last winter's windthrow demonstrates the danger that exists from defective trees that are still standing at Clover Creek. Fortunately, the trees that failed fell before people and structures occupied the site. Mono winds are assumed to be the primary cause of blow down. While these winds are not common in Sequoia Park, when they do occur, they can be strong enough to cause even non-defective trees to fail.

Construction activities at Clover Creek are changing the character of the forest stands. Openings created and trees removed have altered wind patterns and intensities through various positions in the canopy. Future development will cause even more change. Residual trees adjacent to existing and proposed clearings, and near known root disease centers should be examined very thoroughly.

Removal of defective and hazardous trees could be designed into the next phase of construction, but, ideally it should be done sooner, since no construction is scheduled for this summer. We feel the removal of high-risk trees is important enough to warrant a separate and immediate contract. This summer would allow removal of defective and hazardous trees at a time that would not interfere with or complicate other construction efforts. Additionally, a timely entry would prevent the loss of wood value due to stain and decay in those trees windthrown last winter.